

CLAIMS

What is claimed is:

- 1 1. An apparatus for conducting communication operations between a
2 first mobile switching center and a second mobile switching center, comprising:
3 a first Voice over Internet Protocol (VoIP) gateway in electronic
4 communication with the first mobile switching center and an Internet Protocol (IP)
5 network; and
6 a second VoIP gateway in electronic communication with the second
7 mobile switching center and the IP network, wherein the first VoIP gateway receives
8 voice audio from the first mobile switching center and the second VoIP gateway receives
9 voice audio from the second mobile switching center, and wherein the first VoIP gateway
10 converts the voice audio received from the first mobile switching center into a first VoIP-
11 formatted audio for communicating speech information from the first mobile switching
12 center to the second mobile switching center, and wherein the second VoIP gateway
13 converts the voice audio received from the second mobile switching center into a second
14 VoIP-formatted audio for communicating speech information from the second mobile
15 switching center to the first mobile switching center.
- 1 2. The apparatus of Claim 1, wherein the first and second VoIP
2 gateways are integrated into the first and second mobile switching centers, respectively.

1 5. The apparatus of Claim 1, wherein the second VoIP gateway
2 includes a conversion means for converting the VoIP formatted and voice-to-voice audio.

1 6. A method of providing VoIP formatted communications during an
2 inter-exchange handoff operation within a telecommunications network including a
3 Target MSC (TMSC) having a designated channel, and a Mobile Station (MS) served by
4 a Serving MSC (SMSC), wherein a handoff forward call connection operation occurs
5 from the SMSC to the TMSC, comprising the steps of:

6 determining that the handoff forward call connection operation from the
7 SMSC to the TMSC should occur;

8 allocating a first VoIP gateway to the SMSC;

9 allocating a second VoIP gateway including an IP identification address to
10 the TMSC;

11 completing a second voice path between the designated channel and the
12 second VoIP gateway; and

13 completing a first voice path between the SMSC and the first VoIP
14 gateway,

15 wherein the first VoIP gateway is in electronic communication with the
16 second VoIP gateway.

1 7. The method of Claim 6, further comprising the steps of:

2 assigning the designated channel to the TMSC; and

3 moving the MS to the designated channel of the TMSC.

1 8. The method defined in Claim 6, further including the steps of
2 sending an unformatted voice audio signal from the SMSC to the first VoIP gateway;
3 formatting the unformatted voice audio signal within the first VoIP
4 gateway to provide a formatted voice audio signal for transmission over an Internet
5 Protocol (IP) network in electronic communication with the first and second VoIP
6 gateway;
7 transmitting the formatted voice audio from the first VoIP gateway to the
8 second VoIP gateway over the IP network using the IP identification address of the
9 second VoIP gateway; and
10 receiving the formatted voice audio at the second VoIP gateway and
11 recovering the unformatted voice audio signal for sending to the MS.

1 9. The method defined by Claim 6, further including the steps of:
2 formatting a voice over air interface audio signal by the second VoIP
3 gateway to provide a formatted voice over air signal for voice transmission over an IP
4 network in electronic communication with the first and second VoIP gateway;
5 transmitting the formatted voice air interface audio signal from the second
6 VoIP gateway to the first VoIP gateway over the IP network; and
7 receiving the formatted voice over air signal at the first VoIP gateway and
8 recovering the voice over air signal for sending to a call connection maintained by the
9 SMSC.

1 10. A method of providing Voice over Internet Protocol (VoIP)
2 operations during an inter-exchange handoff forward with path minimization call
3 connection operation within a telecommunications network including an Anchor MSC
4 (AMSC), a Target MSC (TMSC) having a designated channel, and a Mobile Station
5 (MS) served by a Serving MSC (SMSC), wherein the AMSC uses a first VoIP gateway to
6 communicate with an internet protocol (IP) network, the SMSC uses a second VoIP
7 gateway to communicate with the IP network, and the TMSC uses a third VoIP gateway
8 to communicate with the IP network, and wherein the handoff forward with path
9 minimization call connection operation occurs from the AMSC to the TMSC, comprising
10 the steps of:
11 determining that a handoff forward call connection operation to the TMSC
12 should occur;
13 verifying that path minimization is supported by the AMSC;
14 allocating the first VoIP gateway to the AMSC;
15 allocating the third VoIP gateway including an IP identification address to
16 the TMSC;
17 storing the IP identification address in the AMSC;
18 completing a voice path between the designated channel and the third
19 VoIP gateway, wherein the first VoIP gateway is in electronic communication with the
20 third VoIP gateway; and
21 directing the SMSC to release the second VoIP gateway.

1 11. The method of Claim 10, comprising the steps of:
2 verifying that the designated channel is available to support the MS; and
3 moving the MS to the designated channel.

1 12. The method defined in Claim 10, further comprising the steps of:
2 sending an unformatted voice audio signal from the AMSC to the first
3 VoIP gateway;
4 formatting the unformatted voice audio signal at the first VoIP gateway
5 into a format suitable for transmission over the IP network;
6 transmitting the formatted voice audio signal from the first VoIP gateway
7 to the third VoIP gateway over the IP network; and
8 receiving the formatted voice audio signal at the third VoIP gateway and
9 recovering the unformatted voice audio signal for sending over an air interface to the MS.

1 13. The method of Claim 10, further comprising the steps of:
2 sending an unformatted voice over air interface audio signal from the
3 TMSF to the third VoIP gateway;
4 formatting the unformatted voice over air interface audio signal at the
5 third VoIP gateway into a format suitable for transmission over the IP network;
6 transmitting the formatted voice over air interface audio signal from the
7 third VoIP gateway to the first VoIP gateway over the IP network; and

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1 14. An apparatus utilizing a first and second Voice over Internet
2 Protocol (VoIP) gateway in electronic communication with an Internet Protocol (IP)
3 network to substitute for the allocation of voice trunks within a telecommunications
4 network, comprising:

5 a first mobile switching center in electronic communication with the first
6 VoIP gateway; and

7 a second mobile switching center in electronic communication with the
8 second VoIP gateway, wherein the first and second VoIP gateways receive voice audio
9 from the first and second mobile switching centers, wherein the first VoIP gateway
10 converts the voice audio from the first mobile switching center into a first VoIP-
11 formatted audio for communicating speech information from the first mobile switching
12 center to the second mobile switching center, and wherein the second VoIP gateway
13 converts the voice audio from the second mobile switching center into a second VoIP-
14 formatted audio for communicating speech information from the second mobile
15 switching center to the first mobile switching center.

1 15. The apparatus of Claim 14, wherein the first VoIP gateway is
2 integrated into the first mobile switching center, and wherein the second VoIP gateway is
3 integrated into the second mobile switching center.

1 18. The apparatus of Claim 14, wherein the second VoIP gateway
2 includes a conversion means for converting the VoIP formatted and voice-to-voice audio.